

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 31 MAR 2006

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Applicant's or agent's file reference 206,712-PCT	<b>FOR FURTHER ACTION</b>		See Form PCT/IPEA/416
International application No. PCT/US04/43718	International filing date (day/month/year) 22 December 2004 (22.12.2004)	Priority date (day/month/year) 24 December 2003 (24.12.2003)	
International Patent Classification (IPC) or national classification and IPC IPC(7): C10G 21/02, 21/18, 5/04 and US Cl.: 208/236, 237, 219, 223, 226, 241			
Applicant SAUDI ARABIAN OIL COMPANY			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>1</u> sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 13 July 2005 (13.07.2005)		Date of completion of this report 07 March 2006 (07.03.2006)	
Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201		Authorized officer Glenn Caldarola Telephone No. (571)-272-1700  DEBORAH A. THOMAS PARALEGAL SPECIALIST <i>DCT</i>	

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US04/43718

## Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

- ☐ the international application in the language in which it was filed.
- ☐ a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
  - ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4(a))
  - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

- ☐ the international application as originally filed/furnished
- ☒ the description:
  - pages 1-18 as originally filed/furnished
  - pages\* NONE received by this Authority on \_\_\_\_\_
  - pages\* NONE received by this Authority on \_\_\_\_\_
- ☒ the claims:
  - pages 20 as originally filed/furnished
  - pages\* NONE as amended (together with any statement) under Article 19
  - pages\* 19 received by this Authority on 19 August 2005
  - pages\* NONE received by this Authority on \_\_\_\_\_
- ☒ the drawings:
  - pages 1/2-2/2 as originally filed/furnished
  - pages\* NONE received by this Authority on \_\_\_\_\_
  - pages\* NONE received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

*\* If item 4 applies, some or all of those sheets may be marked "superseded."*

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

International application No.  
PCT/US04/43718

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Claims <u>NONE</u>	YES
	Claims <u>1-14</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-14</u>	NO
Industrial Applicability (IA)	Claims <u>1-14</u>	YES
	Claims <u>NONE</u>	NO

**2. Citations and Explanations (Rule 70.7)**

Claims 1-14 lack novelty under PCT Article 33(2) as being anticipated by Ou (5,167,797).

Ou discloses a process for removing sulfur compounds (e.g. disulfur) from a liquid hydrocarbon feed by contacting the feed with an extractive agent comprising chlorine containing compounds in the presence of oxidation catalyst. The sulfur content in the hydrocarbon after extraction step is less than 5 ppm. (See entire patent)

Claims 1-14 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

----- NEW CITATIONS -----

**REPLACEMENT SHEET PAGE 19**

1. A process for the removal of sulfur compounds from a liquid hydrocarbon stream which comprises:  
  
contacting a liquid hydrocarbon stream containing sulfur compounds with an aqueous extractive agent selected from the group consisting of sodium and calcium hypochlorite, hypochlorous acid, chlorous acid, perchloric acid, chlorine dioxide, cyanuric acid and its salts, alkali metal and alkaline earth metal hydroxides, and mixtures thereof, under conditions and for a period of time which is effective to reduce the sulfur content of the hydrocarbon stream.
2. The process according to claim 1, wherein said liquid hydrocarbon stream is selected from the group consisting of a hydrocarbon gas (NG) stream, a liquified natural gas (LNG) stream, natural gas liquids (NGL) and a liquid hydrocarbon stream.
3. The process according to claim 1, wherein said sulfur compounds are selected from the group consisting of hydrogen sulfide, carbon disulfide, carbonyl sulfide, mercaptans, thioethers, sulfides, disulfides, and mixtures thereof.
6. The process according to claim 1, wherein the cyanuric acid and its salts are selected from the group consisting of syn-triazine-2, 4, 6-triol, 1, 3,5-triazine-2,4,6 (1H, 3H, 5H)-trione, syn-triazinetriol, 2,4,6-trihydroxy-1,3,5-triazine, trihydroxycyanidine, tricyanic acid, sodium trichloroisocyanuric acid, and mixtures thereof.